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Local Excision of Rectal Carcinoma: A Safe Alternative for More Advanced Tumors?

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Background and Objectives: Local excision of rectal carcinoma has primarily been limited to patients with small (≤3 cm), early rectal carcinoma. We wanted to determine whether local excision (transanal or transacral), when combined with selective chemoradiation therapy, would be adequate treatment for patients with larger (>3 cm) and more advanced T3 and N1 tumors.

Methods: A prospective study of 20 patients with clinical T1–T3, N0–N1 rectal carcinoma was initiated in 1990. Local excision (transanal or transacral) was performed on all patients. Sixteen patients were treated with postoperative 5-fluorouracil (5-FU) and leucovorin (LV) combined with radiation therapy; six high-risk patients (T3 or N1) received an additional 6 months of 5-FU and LV. All patients were followed for a minimum of 4 years.

Results: Tumor size ranged from 2 to 5.5 cm (mean, 3.6 cm). Histology revealed well or moderate differentiation (19/20), gross or microscopic ulceration (14/20), and vessel invasion (5/20). Mucosal margins were 3–12 mm (mean, 8.3 mm); radial margins were clear in all patients except one (microscopically positive). Five patients had T3 tumors; two had node positive tumors (N1). With a median follow-up of 56 months (48–71), there have been no local or regional failures and two patients have died from metastatic disease.

Conclusions: Local excision, when combined with selective chemoradiation therapy, can be safely applied to patients with large (>3 cm) and more advanced T3 and N1 rectal carcinomas.

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KEY WORDS: **rectal neoplasms; surgery; adenocarcinoma**

INTRODUCTION

Local excision of rectal carcinoma, with or without radiation therapy, has gained increasing acceptance as treatment for T1 and T2 rectal adenocarcinoma [1]. The use of local excision for larger and more advanced T3 rectal carcinomas, however, remains highly controversial. Concerns have been raised regarding the difficulty in obtaining clear radial margins and the 50%–70% risk of associated lymph node metastases [2–4].

Since tumor size, however, is not an independent prognostic factor in rectal carcinoma [5,6], and with the identification of chemoradiation therapy capable of controlling microscopic metastatic disease [7–9] and the lack of data demonstrating a benefit from aggressive lymphadenectomy, we elected to offer local excision to patients with larger (>3 cm) and more advanced T3 or N1 rectal cancers. Early toxicity results with this approach were previously reported [10]. This article reviews our long-term recurrence and survival data with a minimum 4-year follow-up of all patients, using local excision and selective chemoradiation therapy for patients with rectal carcinoma.

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MATERIALS AND METHODS

Patient Eligibility

Since 1 July 1990, all patients seen at New England Medical Center with rectal adenocarcinoma located within 7 cm of the anal verge were considered for enrollment into this trial. Patients were considered eligible if their tumor met the following criteria: T1–T3, N0–N1, mobile tumor on digital rectal examination, and tumor size felt to be compatible with complete local excision and histologically negative margins. All patients had a complete history and physical examination, intrarectal ultrasound, and a metastatic survey, including a chest X-ray and CT scan of the abdomen and pelvis. Informed consent was obtained from all patients, and all procedures followed were in accordance with the ethical standards and guidelines of the Human Investigation Review Committee at the New England Medical Center and with the Helsinki Declaration of 1975, as revised in 1983.

Treatment Plan

All patients underwent resection of their rectal carcinoma by either a transanal or posterior transacral approach. Transanal excision was offered only to patients whose tumors were confined to the bowel wall (T1–T2) by preoperative staging. Following pathologic review, patients were divided into one of three categories according to their risk of nodal metastases: Group 1, T1–T2, N0–NX, with favorable histologic features (well differentiated or moderately differentiated tumor, polypoid in configuration, with no lymphatic or vascular invasion); Group 2, T1–T2, N0–NX, with any unfavorable histologic feature; and Group 3, T3, N0–NX or T1–T3, N1. Group 1 patients were offered surgery alone. Group 2 patients were treated with combined chemoradiation therapy starting 4 to 10 weeks after surgery. Radiation therapy was given to the pelvis and tumor bed using a multiple-field technique designed to include the entire true pelvis plus the immediately draining lymph nodes. Patients were treated to a dose of 45 Gy in 25 fractions over 5 weeks, with a boost coned-down field of 9 Gy in five fractions to the tumor bed with a minimal margin of 3 cm. 5-fluorouracil (5-FU) and leucovorin were given on days 1 to 5 and 36 to 40 during the radiation therapy. Leucovorin (200 mg/m^2/day) was given by intravenous (IV) bolus and was followed by an IV bolus of 5-FU 375 mg/m^2/day. Group 3 patients were offered both combined chemoradiation therapy plus an additional six cycles of 5-FU and leucovorin. Beginning 4 weeks after completion of chemoradiation therapy, leucovorin (20 mg/m^2) by IV bolus followed by 5-FU (425 mg/m^2) by IV bolus was administered on days 1 to 5. Cycles were repeated every 4 weeks for the first three cycles and every 5 weeks for the last three cycles.

TABLE I. Rectal Carcinoma Patients Treated With Local Excision and/or Chemoradiation Therapy*

	TNM stage	Number of patients
Group 1	T1 N0	2
	T1 NX	2
Group 2	T1 N0	1
	T1 NX	1
	T2 N0	4
	T2 NX	4
Group 3	T2 NX[a]	1
	T3 N0	2
	T3 NX	1
	T3 N1	2

*Group 1, low risk; Group 2, intermediate risk; Group 3, high risk.
[a]Patient with recurrent disease following failed transanal excision.

Follow-Up

Patients were followed every 3 months for 2 years and then every 6 months for years 3–5. A complete history, physical examination, and carcinoembryonic antigen (CEA) determinations were required at each visit. Intrarectal ultrasound was performed every 6 months for 2 years. Chest X-ray and CT scans of the abdomen and pelvis were performed on a yearly basis.

RESULTS

Twenty patients (14 males, 6 females), ages 32–88, were treated on protocol. There were 4 patients with a low-risk T1–T2 N0–NX carcinoma (Group 1), 10 patients with a high-risk T1–T2 N0–NX carcinoma (Group 2), and 5 patients with a T3 or N1 carcinoma (Group 3). One patient with a local recurrence following transanal excision performed elsewhere was treated as a high-risk group 3 patient (Table I). Seven patients underwent transanal excision of their rectal tumor; no lymph nodes were identified in any specimen. Thirteen patients underwent transacral resection. Twelve patients had lymph nodes identified in the resected specimens, two of which were positive for metastatic carcinoma. An average of three lymph nodes (range, 0–5) were removed from these 13 cases.

Tumor size ranged from 2 to 5.5 cm (mean, 3.6 cm; median, 4.0 cm). Histology revealed well or moderate differentiation (19/20), gross or microscopic ulceration (14/20), and lymphatic or vascular invasion (5/20). Mucosal margins were 3–12 mm (mean, 8.3 mm); radial margins, measured perpendicularly through the bowel wall into perirectal fat, were histologically negative in all patients except for one who had a single, microscopic focus of tumor identified at the margin in one slide only.

Since the choice of operation was predicated on the preoperative stage, we compared the preoperative clinical stage as determined by intrarectal ultrasound and the postoperative pathologic stage of each patient to deter-

TABLE II. Rectal Carcinoma Patients Treated With Local Excision and/or Chemoradiation Therapy*

Procedure	Preoperative stage (number of patients)		Postoperative stage (number of patients)	
Transanal (7)	T1	(1)	T1 NX	(1)
	T2	(6)	T1 NX	(2)
			T2 NX	(4)
Transacral (13)	T1–T2	(6)	T1 N0	(2)
			T2 N0	(2)
			T3 N0	(2)
	T3	(7)	T1 N0	(1)
			T2 NX–N0	(3)
			T3 NX–N1	(3)

*Comparison of preoperative T-stage based on intrarectal ultrasound with postoperative pathologic T-stage.

mine how often the proposed operative procedure was correctly recommended (Table II). Of 13 patients preoperatively staged as having a T1 or T2 tumor, 2 (15%) were found to have T3 tumors. Fortunately, both patients underwent a transacral resection based on surgeon preference and had negative radial margins. Of seven patients preoperatively staged as having a T3 tumor, four (57%) had either a T1 or T2 tumor and might have been adequately treated with transanal excision. No patients had suspicious lymph nodes identified by preoperative ultrasound staging.

Five-year actuarial local recurrence and survival results were 0% and 90%, respectively. At a median follow-up of 56 months (range, 48–71 months), no patient has developed recurrent tumor in the rectum or pelvis. Two patients died of distant metastatic disease. While it is possible that metastases resulted from missed microscopic disease at the original surgery, both patients lived more than 18 months with systemic disease and never manifested signs of local or regional failure.

DISCUSSION

Multiple treatment options for rectal carcinoma currently exist, including low anterior resection with or without mucosal proctectomy and coloanal anastomosis [11–13], local excision performed either transanally or through a posterior transacral approach [14–18], endocavitary radiation [19–21], and electrocoagulation [22–24]. Most authors have limited the use of local excision to small tumors confined to the bowel wall [15,25–27]. In the recently completed Intergroup Trial (Cancer and Leukemia Group B, Radiation Therapy Oncology Group, and Eastern Cooperative Oncology Group), entry criteria for local excision candidates included tumor size less than or equal to 3 cm and lumenal circumference less than or equal to 40% [1].

As one explores the role of local excision in the management of patients with rectal carcinoma, it is important to understand the difference between a transanal and transacral procedure. Transanal excision is performed with limited visualization of the perirectal fat, no attempt to retrieve adjacent lymph nodes, and is technically limited to the removal of relatively small tumors. A posterior transacral resection allows for excellent visualization of the perirectal fat, routine retrieval of lymph nodes, and can be used for larger, bulky tumors, utilizing a sleeve resection of the rectum when necessary. Most published series on local excision reflect the use of a transanal approach [15,25,26], and this presumably explains surgeons' reluctance to extend the indication for local excision to larger, more advanced tumors.

Many surgeons now provide sphincter preservation with a low anterior resection and coloanal anastomosis with or without use of a J-pouch colonic reservoir. Paty et al. [12] reported their experience with this approach in 130 patients with primary rectal carcinoma, utilizing radiation therapy and chemotherapy in selected patients. Five-year actuarial survival was 73%, with 10% of patients developing a pelvic recurrence. Cavaliere et al. [28] reported a similar experience combining data from 117 patients undergoing surgery at the Mayo and Cleveland Clinics. Five-year actuarial survival was 69%, with 7% of patients developing either a local or regional failure.

In addition to the 7%–10% local failure rate, this operative approach is associated with significant morbidity. Cavaliere et al. [28] reported the following complications: anastomotic leakage (18%), stricture formation (21%), urinary retention (15%), and sexual dysfunction (14%). Perfect continence was achieved in only 43% of patients. Moreover, given the abdominal component of the surgery, all patients required significant recovery time with its attendant affect on hospital length of stay, and most patients required a second operation for takedown of their protective ileostomy or colostomy.

Transanal excision of rectal carcinoma in our study (7/20 patients) was associated with minimal morbidity. No complications were identified, continence was normal in all patients, and discharge took place within 24 hr of surgery. Transacral resection (13/20 patients), on the other hand, was associated with significant morbidity: wound infection (6/13 patients, 46%), fistula formation (3/13 patients, 23%), temporary urinary incontinence (2/13 patients, 15%), and sexual impotence (2/13 patients, 15%). Four patients (31%) had occasional fecal incontinence; all received combined chemoradiation therapy and had altered rectal compliance by anorectal manometry.

Given the morbidity of a transacral resection, it would be ideal either to limit this operation to patients with T3 rectal carcinomas or to treat patients with clinical T3 tumors with preoperative chemoradiation therapy followed by transanal excision of residual disease. Both of these proposals require accurate preoperative definition

of tumor invasion into the bowel wall. Intrarectal ultrasound has been the most sensitive imaging modality used, with a reported accuracy as high as 95% [29], although these authors do comment on their own steep learning curve. In our hands, intrarectal ultrasound understaged 2 of 13 patients (15%) and overstaged 4 of 7 patients (57%). While this may simply reflect our own learning curve in the use of intrarectal ultrasound, we are now evaluating the use of magnetic resonance imaging (MRI) with a endorectal pelvic coil to better stage our patients prior to surgery.

The use of local excision for more advanced T3 and N1 tumors relies on the use of chemoradiation therapy to help sterilize microscopic extrarectal disease, although the exact indications for adjuvant therapy in this group of patients have not been defined. A transacral approach does allow for accurate pathologic staging. Visualization of the perirectal fat is excellent, and radial margins can be easily stained and measured. Adjacent perirectal lymph nodes can also be sampled. Since lymphatic metastases occur in an orderly and predictable pattern, this sampling should provide accurate nodal staging. Based on this information, future trials should be able to address the relative roles of radiation therapy and chemotherapy and establish indications for one or both therapies based on pathologic staging.

There is sufficient evidence to support the use of local excision, with or without radiation therapy, for early, favorable T1 and T2 tumors. Our series would suggest that local excision, when combined with chemoradiation therapy, may allow us to extend the indications safely to more advanced T3 and N1 tumors. It clearly demonstrates that local excision need not be limited to small ($\leq$3 cm) tumors, as the mean size of our tumors was 3.6 cm (2–5.5 cm). The role of local excision, and the indications for adjuvant chemotherapy and radiation therapy, still needs to be explored. If the Intergroup Trial confirms the safety of this approach with more limited tumors, it will be time to explore these same approaches with more advanced disease.

Local excision of rectal carcinoma, when combined with selective chemoradiation therapy, results in excellent local-regional control and long-term survival. This approach can be safely applied to more advanced tumors (>3 cm), including those with extramural extension (T3) and limited nodal disease (N1).

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